CZECHOSLOVAKIA

CHURY, Z; MARTINEK, K.

1. Chair of Pathological Physiology (Katedra patologicke fyziologie), Brno; 2. Third Internal Medicine Clinic of J. E. Purkyne University (III. vnitrni klinika University J. Ev. Purkyne), Brno

Prague, Vnitrni lekarstvi, No 10, 1963, pp 1015-1018

"A Contribution Relative to the Present Incidence of Leukemia and Hepatic Cirrhosis."

UNGER, Yu.; CHURYA, E.; VOLANSKIY, D.

Influence of a brain lesion on the bioelectrical reaction in rhythmic light stimulation. Fiziol. zhur. 47 no.6:704-710 Je '61. (MIRA 15:1)

1. From the I.P.Pavlov Neurological Institute Rumanian People's Republic Academy, Bucuresti.
(BRAIN--WOUNDS AND INJURIES) (ELECTROENCEPHALOGRAPHY)
(LIGHT--PHYSIOLOGICAL EFFECT)

CHURYLAU,A.; SMIRNOVA,V.

I.V.Michurin; on the 100th anniversary of his birth. Rab.isial. 31 no.10:14-15 O'55. (MLRA 8:12)
(Michurin, Ivan Vladimirovich, 1855-1935)

CHURYLAU, A.K.

Perennial grasses on peat bog soils and the action of their root systems on soil. Vestsi AN BSSR.Ser.biial.nav. no.3:15-25 '56.
(MLRA 10:1)

(Grasses) (Peat soils)

Country : USSR J
Category : Soil Science. Physical and Chemical Properties of Soil.
Abs. Jour.: Ref. Zhur.-Biologiya No. 11, 1958. No. 48611

Author : Churylew, A.K.
Institute : Acad. Sciences, Belorussian SSR
Title : Physical Property Changes in Peat-Bog Soils of the Bottomland Type During Various Stages of Decomposition of the Organic Matter
Orig. Pub.: Izv. AN BSSR. Ser. biol. n., 1956, No. 4, 19-31

Abstract : Soils where the peat had decomposed up to 35% contained 1.81 - 2.4 percent silica, while soil with 55% peat decomposition had 14.32 - 21.74% silica; the first soil contained 0.93 - 1.18% Fe oxides, the second had 4.60-8.23%; the corresponding percentages of Al were 1.31 - 2.03 and 3.31 - 5.35%; of Ca 2.54 - 4.16 and 3.14 - 5.75%. The largest amounts of mineral substances were

Card: 1/3

Country : USSR J
Category : Soil Science. Physical and Chemical Properties of Soil.
Abs. Jour. : Ref. Zhur.-Biologiya No. 11, 1958. No.48611

Author :
Institute :
Title :

Orig. Pub.:

Abstract : contained in fractions whose diameters were less than 0.01 mm. The combination of soil colloids of opposite charges and the presence of large particles imparts a microaggregate state to the hard phase of peat soils having well decomposed organic matter. Silica and sesquioxides play an important role in the structural formation of these soils. The structure of peat-bog soils of the lowland type in which 55% of the organic

Card: 2/3

Country : USSR J
Category : Soil Science. Soil Genesis and Geography.

Abs. Jour.: Ref. Zhur.-Biologiya No. 11, 1958. No. 48611

Author :
Institute :
Title :

Orig. Pub.:

Abstract : matter is decomposed has 18.02% of its fractions larger than 3 mm, 39% between 3 and 0.25 mm, and 42.76% smaller than 0.25 mm. Soil in which 35% peat decomposition had occurred contained 45.27% aggregates larger than 3 mm, 49.97% between 3 and 0.25 mm, and 4.75% smaller than 0.25 mm.
--S.A. Nikitin

Card: 3/3

CHURYUMOV, I.

Results of centralized management. Avt.transp. 38 no.10:38-39 O '60.
(MIRA 13:10)

1. Upravlyayushchiy Stalingradskim gorodskim avtotrestom.
(Satlingrad—Transportation, Automotive)

CHURYUMOV, I.P., shofer avtodreziny (g. Ordzhonikidze)

Cutting costs. Put' i put.khoz. 4 no.8:27-28 Ag '60. (MIRA 13:7)

(Railroad motor cars--Maintenance and repair)

CHURYUMOV, V.

Power driven lacquer feeder. Stroitel' no.4:8 Ap '58. (MIRA 11:5)

1.Glavnyy mekhanik Stalingradskogo stroitel'no-montazhnogo upravleniya tresta Soyuzteplostroy.
(Spray painting)

BERDYANSKIY, M.G.; CHUS, V.G.; BRODSKIY, I.I.; VEYEVNIK, V.F.; VITNOV, L.I.; GRINVAL'D, V.A.; TOLDAYEV, A.S.

Automatic machine for screwing unions. Biul. tekh.-ekon. inform. Gos. nauch.-issl. inst. nauch. i tekh. inform. 17 no.12:27-29 D '64. (MIRA 18:3)

43911

1.2300

Z/056/62/019/002/012/014
I037/I242

AUTHORS: Falkievič, A.S. and Chusanov, Ch.

TITLE: New methods in welding and controlling of welded joints in construction of long distance gas and water systems

PERIODICAL: Přehled technické a hospodářské Literatury, Hutnictví a strojírenství, v.19, no.2, 1962, 108, abstract HS 62-1370 (Zváranie, v.10, no.7, 1961, 194-198)

TEXT: Welding of pipes under flux, on special welding supports on which 8-12 pipes can be welded into 35-40 m sections. Rotating levellers allow welding at a rate of 35-40 m/hour, by means of a ø= 2 cm welding wire and a current up to 600 A. Hydraulic centering arrangement. Automatic ASP-60 instrument for welding, rotation of

Card 1/2

Z/056/62/019/002/012/014
I037/I242

New methods in welding and controlling...

pipes in CO_2. Automatic AS-59 instrument for welding of non-rotating joints. Resistance welding of pipes. Manual arc-welding of tubing. (Translation from Russian). 8 photographs.

X

[Abstracter's note: Complete translation.]

Card 2/2

CHUSHENKOVA, M. YA.

Mbr., Central Special Construction Trust, -1947-.

"Welding 'drop-shaped' reservoirs," Avtogen. Delo, No. 3, 1948
"Clamp for centering pipe for welding," ibid., No. 8, 1948

CHUSHENKOVA, M.

Preparation of a figure-eight form. Mpv.neft.tekh.: Stroi.i mont. no.4:8 '48. (MLRA 9:5)
(Building)

CHUSHENKOVA, M. YA. PA 233T35

USSR/Metallurgy - Welding, Steel, Electrodes Jul 52

"Welding Pipes Made of Kh5M Steel," A. G. Mazel', L. S. Livshits, Candidates Tech Sci, M. Ya. Chushenkova, Engr, NIIStroyneft' /Sci Res Inst oor Construction of Enterprises of the Gas and Petroleum Ind?/

"Avtogen Delo" No 7, pp 1-6

Investigates several types of electrodes for welding pipelines made of Kh5M Cr-Mo steel, widely used at petroleum refineries and working under pressure up to 70 atm at temps up to 550° C.
Experimentally establishes that electrodes made of 18-8 steel provide for obtaining welds with lowest tendency to hot crack formation and with highest erosion resistance without preheating of pipes to be welded. Editors disagree with authors, stating that their conclusions relate only to certain heats of 18-8 steel and cannot be generally accepted without preliminary test of electrodes.

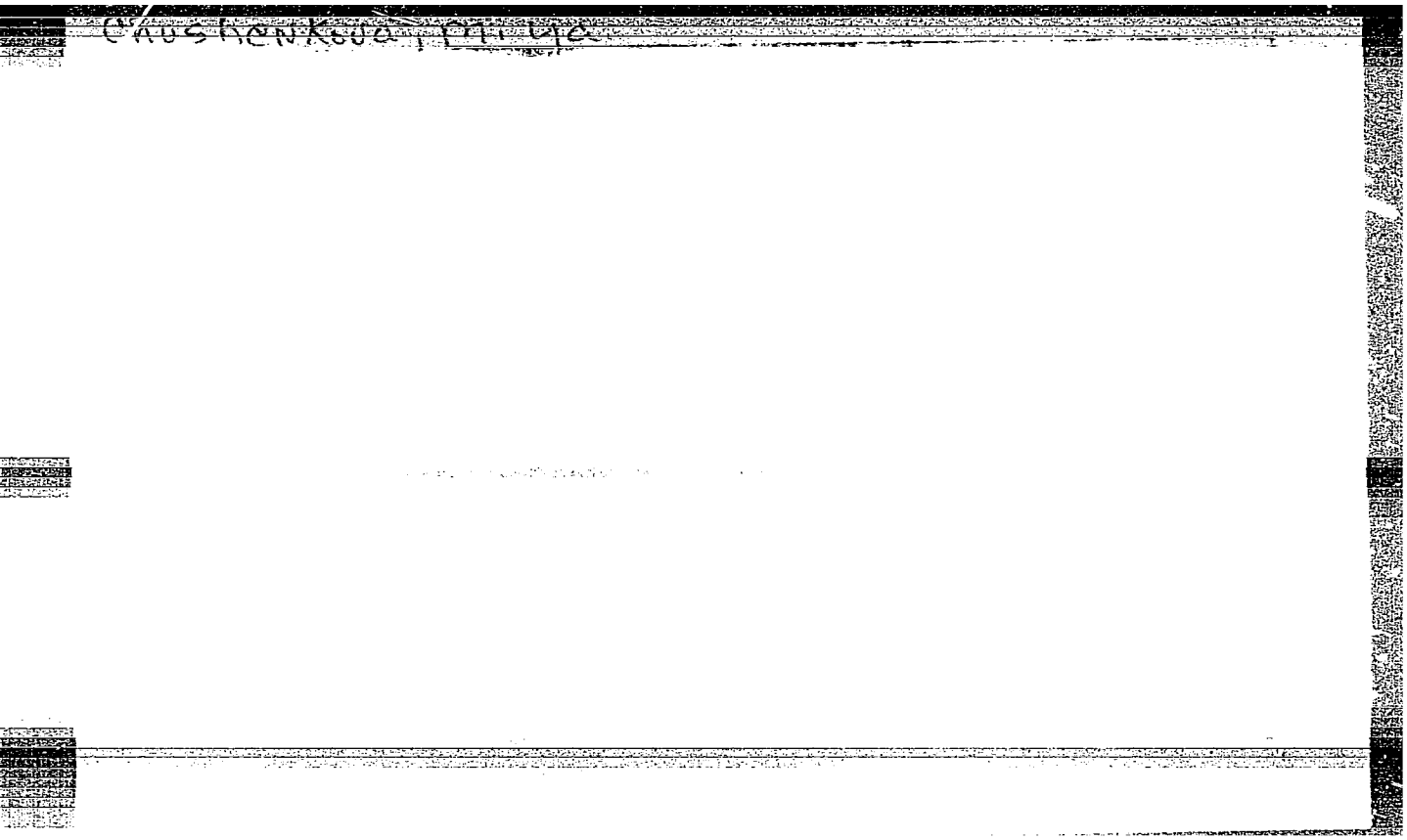
PA 233T35

CHUSHENKOVA, M. YA., Livshits, L. S., and Mazel, A. G.

"The Welding of Chromium (4½ per cent)-Molybdenum Steel Tubes" (Avto. Delo, 1952, 23, July, p. 1)

Type Kh5M (4½ per cent Cr-Mol) steel is a creep-resisting steel used in the oil industry for tubular assemblies working at up to 70 atmospheres and 550 degrees C. In assembly shops, it may be welded with electrodes of the same wire composition and a low hydrogen lime-ferritic coating, but must be fully heat treated after welding. For site-welding, a molybdeum-bearing 18-8 austenitic electrode giving a duplex weld metal structure (i. e., containing some ferrite) must be used.

A hot cracking test is described, in which newly completed welds are impact tested; the criterion is the number of seconds during which the cooling weld still fractures brittle (cf. hot cracking test in ref. 18)



MAZEL', A.G., kandidat tekhnicheskikh nauk; LIVSHITS, L.S., kandidat tekhnicheskikh nauk; CHUSHENKOVA, M.Ya., inzhener.

Welding Kh5M steel pipes. Trudy VNII Stroinefti no.4:26-45 '56. (MLRA 10:1)

(Pipe, Steel--Welding)

LIVSHITS, L.S., kandidat tekhnicheskikh nauk; MAZEL', A.G., kandidat tekhnicheskikh nauk; CHUSHENKOVA, M.Ya., inzhener; BAKHRAKH, L.P., inzhener.

Welding 12Kh5MA steel pipes. Trudy VNIISTROINEFT' no.7:86-97 '56. (MLRA 9:11)

(Pipe, Steel--Welding)
(Heat resistant alloys)

CHUSHENKOVA, M. YA.

123-1-539

Translation from: Referativnyy Zhurnal, Mashinostroyeniye, 1957, Nr 1, p. 86 (USSR)

AUTHORS: Livshits, L.S., Chushenkova, M.Ya.

TITLE: Welding Pipes Made of Non-Molybdenum Substitutes of 12 X 5 MA Steel (Svarka trub iz bezmolibdenovykh zameniteley stali marki (2 X 5 MA).

PERIODICAL: Tr. Vses. n.-i. in-ta po str-vu, 1956, Nr 7, pp.98-107

ABSTRACT: The authors present results of their study of properties of welded joints of non-molybdenum steels 12 X 5 and 12 X 5ВФ grades, which are designated as the material for pipe-lines in refineries in replacement of the 12 X 5 MA steel which contains Mo (molybdenum). The evaluation of welded joint properties was conducted according to the indices for hardness and toughness in various spots of the welded joints after their technological ageing at 400° during 1,000 hours and without ageing, and according to a critical temperature of brittleness

Card 1/2

Welding Pipes Made of Non-Molybdenum Substitutes (Cont.) 123-1-539

in the area with lowest properties. The welding was done by austenite electrodes with the ЦЛ-3М and ЭНТУ-3 coatings, and by the ЦЛ-17 electrodes. They have established that the properties of welded joints of the 12 X 5 and 12 X 5ВФ steels are equivalent to those of the 12 X 5МА steel. It is recommended to weld the above-named steels in pipe lines with austenite electrodes having core of the X25H15 or 0X18Н9 steels without subsequent heat-treatment of the welded joints, or weld them by the ЦЛ-17. electrodes; in the latter case heat treatment of welded joints is imperative.

Z.V.N.

Card 2/2

CHUSHEV, Mikhail Romanovich; MAZUR, M., red.

[Precision casting] Tochnoe lit'e. Tula, Prickskoe knizhnoe izd-vo, 1964. 72 p. (MIRA 18:4)

CHUSEV, V.G.

The performance of a three-column mash rectification apparatus. V. G. Chusov. *Spirtovaya Prom.* 21, No. 3, 21-3(1955).—A new app. is presented as a drawing, and all the temps., pressures, and analyses for EtOH, MeOH, furfural, esters, and acidity are given for each of the columns. ND

Werner Jacobson

CHUSHKIN, A.I., inzh.

New incandescent lamps developed by the Riga electric lamp factory.
Svetotekhnika 6 no.9:25-26 S '60. (MIRA 13:9)
(Riga--Electric lamps)

AUTHOR: Chushkin, M.I., Candidate of Biological Sciences 3-7-21/29

TITLE: Independent Work of Students in Practical Courses of Physiology (Samostoyatel'naya rabota studentov v fiziologicheskom praktikume)

PERIODICAL: Vestnik Vysshey Shkoly, 1957, # 7, pp 79-80 (USSR)

ABSTRACT: The author describes practical training experiences of the Chair of Zoology of the Ural'sk Pedagogical Institute, which prove that the students are able to do independent laboratory work, inspite of the opinion of some teachers.

At the aforementioned institute, it was decided to modify the practical training methods, and to reorganize the work schedule by taking into consideration the amount of time necessary for the execution of each task. There was also the problem of laboratory equipment, which, however, was solved within a short time. As a result based on the new method the students took more time than previously in their first practical experiment but by the third experiment they had adapted themselves to the working method. This practice permits to develop their knowledge and simultaneously offers an incentive whereby the best students are excused from tests.

Card 1/2

3-7-21/29

Independent Work of Students in Practical Courses of Physiology

ASSOCIATION: The Ural'sk Pedagogical Institute (Ural'skiy pedagogicheskiy institut)

AVAILABLE: Library of Congress

Card 2/2

CHUSHKIN, M.I., kand.biol.nauk

Conducting experiments in the study of conditioned reflexes. Biol. v shkole no.2:35-37 Mr-Ap '58. (MIRA 11:4)

1. Ural'skiy pedagogicheskiy institut.
(Physiology--Study and teaching) (Conditioned response)

CHUSKIN, P. I., SHMYSLEVSKIY, YU. D. and KATSOVA, O. N.

"Certain Problems of Gas Dynamics" a paper presented at the Conference on Methods of Development of Soviet Mathematical Machine-Building and Instrument-Building, 12-17 March 1956.

Translation No. 596, 8 Oct 56

CHUSHKIN, P. I.

"Computation of Some Potential Secondary Sound Flows of Gas."

dissertation defended for the degree of Cand. of Phys-Math. Sci. at the Inst. of Math. im V. A. Steklov,

Defense of Dissertations (Jan-Jul 1957)
Section of Physical Math. Sci.
Vest. AN SSSR, v. 27, No. 12, 1957, pp. 108-9

CHUSHKIN, P. I.,

"Calculation of the Circulation Distribution Along Rectangular Wings of Low Aspect Radio," Collection of Theoretical Papers in Aerodynamics, Moscow, Oborongiz, 1957.

This collection assembles a number of scientific reports, on theoretical aerodynamics, first printed in various publications between 1947 and 1952, and intended for research workers in advanced aerodynamics.

The report, first published 1949, presents a method of calculating the curculation along rectangular wings of low aspect ratio. The wing is replaced by a series of vortex filaments uniforly (con'td. card 2)

niformly distributed along the wing chord, and on the lines midway between the vortex lines the downwash of the flow is calculated and the boundary conditions are satisfied. The integro-differential equations obtained are solved by a method analogous to Multhopp's method. The constant coefficients entering into the systems of equations obtained are here calculated approximately; they are shown to be functions of the wing aspect ratio. A method of successive approximations is suggested for the solution of the systems of equations. The report is divided into the following sections: Introduction; 1. Determination of the velocities caused by a straight-line lifting filament; 2. Integral equation for a wing in the case of a single lifting vortex; 3. Integral equation for a wing in the case of several vortex lines; 4. Determining the characteristics of a wing. Note on calculation of compressibility; 5. Comparison of the proposed method with Wieghardt's method. Results of calculations and experiments. The report contains 8 figures and 4 tables. There are 10 references, of which 6 are German, 3 Soviet and 1 English.

SOV/124-58-11-12266
Translation from: Referativnyy zhurnal, Mekhanika, 1958, Nr 11, p 43 (USSR)

AUTHOR: Chushkin, P. I.

TITLE: Subsonic Gas Flow Past Elliptic and Ellipsoidal Bodies (Obtekaniye ellipsov i ellipsoidov dozvukovym potokom gaza)

PERIODICAL: Vychisl. matematika, Nr 2, 1957, pp 20-44

ABSTRACT: The solution of the nonlinear equations involved is reduced approximately to the problem of integration of systems of ordinary differential equations. Calculations made by the author on high-speed electronic computers show that convergence occurs rapidly under the method that he employs, which enables him, in effect, to confine himself to a system of only a few equations. He compares his results with those obtained under other theories.

I. M. Yur'yev

Card 1/1

Chushkin, P.I.

PA - 3130

AUTHOR P.I. CHUSHKIN

TITLE The Flow Round Ellipses of a Gas Flow with Sound-Velocity. (Obtekaniye ellipsov potokom gaza so skorost'yu zvuka.- Russian.)

PERIODICAL Doklady Akademii Nauk SSSR 1957, Vol 113, Nr 3, pp 517-519 (USSR).

Received: 6/1957 Reviewed: 7/1957

ABSTRACT On the occasion of the employment of electronic computers for the solution of some nonlinear problems of gas dynamics the numerical method suggested by A.A.DORODNYTSIN proved to be especially effective. In a similar manner the author here computes the flow mentioned in the title.
The gas is assumed to flow with the velocity of sound along the large axis of the ellipse. As is known, two semi-finite characteristics exist in this case, which start at the body (trunk ?) and subdivide the entire flow into two domains. The author computes the mixed motion of the potential within the domain I (i.e. in an upward flow of the characteristics), which may be constructed independently of the motion within the domain II and is described by means of a continuity equation and by an equation expressing the vortex-less character. The equations

CARD 1/3

The Flow Round Ellipses of a Gas Flow with Sound-Velocity.

resulting from the introduction of dimensionless quantities are explicitly given. Next, the boundary conditions of the problem are given.

By integration of the above mentioned dimensionless equations two integral relations are obtained. The solution of the problem can be carried out with various degrees of accuracy of the approximation. In the n-th approximation integral relations are obtained for $n = 1,2,\ldots,N$, after introduction of N-1 intermediate lines 2 N. By means of the approximations given here all boundary conditions can be satisfied accurately. At the N-th approximation a system of 2N+2 ordinary differential equations is obtained. After integration of this system the field of velocities and especially the sound line can be constructed.

By means of this method the ellipse $\delta = 0,2$ and the circle were computed on the computer BESM. Results are shown in form of a diagram. The third approximation gives sufficient accuracy. In an analogous manner also the flow round rotation ellipsoids and any profiles can be computed.

PA - 3130

The Flow Round Ellipses of a Gas Flow with Sound Velocity.

(3 Illustrations and 1 Table.)

ASSOCIATION: Computation Center of the Academy of Science of the U.S.S.R.
PRESENTED BY: A.A. DORODNITSYN, Member of the Academy, 23.10. 1956.
SUBMITTED: 20.10. 1956.
AVAILABLE: Library of Congress.

CARD 3/3

CHUSHKIN, P. I.

16(0); 28(2) PHASE I BOOK EXPLOITATION SOV/3365

Akademiya nauk Azerbaydzhanskoy SSR

Tezisy dokladov Soveshchaniya po vychislitel'noy matematike i primeneniyu sredstv vychislitel'noy tekhniki (Outlines of Reports of the Conference On Computational Mathematics and the Use of Computer Techniques) Baku, 1958. 63 p. 400 copies printed.

Additional Sponsoring Agencies: Akademiya nauk SSSR. Vychislitel'nyy tsentr, and Akademiya nauk SSSR. Institut avtomatiki i telemekhaniki.

No contributors mentioned.

PURPOSE: This book is intended for pure and applied mathematicians, scientists, engineers and scientific workers, whose work involves computation and the use of digital and analog electronic computers.

COVERAGE: This book contains summaries of reports made at the Conference on Computational Mathematics and the Application of Computer Techniques. The book is divided into two main parts. The first part is devoted to computational mathematics and contains 19 summaries of reports. The second section is devoted to computing techniques and contains 20 summaries of reports. No personalities are mentioned. No references are given.

AVAILABLE: Library of Congress (QA75.S7)

Card 7/7

AC/fal
4-13-60

subsonic gas flow (symmetric case); calculating annular supersonic nozzles and diffusers; calculating the lowest characteristic number of Peierls' equation by the Monte Carlo method; study of the oscillation of beams of constant cross section by means of balance type integral equations; calculation of the flow around a circular cylinder with detached shock wave; and new routines for computing finite differences on computers. References accompany each article.

TABLE OF CONTENTS:

AVAILABLE: Library of Congress

Card 8/8

AC/mmh
4-26-60

CHUSHKIN, P.I.

Calculating a subsonic gas flow around an arbitrary profile and body of revolution (symmetric case). Vych.mat. no.3:99-110 '58. (MIRA 12:1)

(Aerodynamics) (Differential equations)

10(2)

AUTHOR: Chushkin, P. I. SOV/20-125-4-16/74

TITLE: Subsonic Circulation Flow Past Ellipses
(Dozvukovoye obtekaniye ellipsov s tsirkulyatsiyey)

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 125, Nr 4, pp 748-751 (USSR)

ABSTRACT: By using numerical computation methods and electronic computers it is possible, with good effect, to solve various problems of gas dynamics and to obtain results which are suited also for the purpose of verifying the accuracy of analytical approximation methods. By employing such a numerical method (Ref 1) the author computed the circulation-less subsonic flow round an ellipse by a gas flow with a velocity U_∞ which was parallel to the axis in infinity. The present paper deals in a similar manner with the same flow but with circulation. By using the elliptical coordinates ξ and η and dimensionless quantities (as characteristic parameters the half focal distance, the maximum velocity in the gas and the compression density were selected), the

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continuity equation and the equation for freedom from vortices are $\frac{\partial \chi}{\partial \xi} + \frac{\partial \omega}{\partial \eta} = 0$, $\frac{\partial \lambda}{\partial \xi} - \frac{\partial \mu}{\partial \eta} = 0$. Here it holds that $\chi = H\varrho u$; $\omega = \overline{H}\varrho v$; $\lambda = Hv$; $\mu = \overline{H}u$; $H = \overline{H} = \sqrt{sh^2\xi + \sin^2\eta}$; u and v are the velocity components along the hyperbolas and ellipses; $\varrho = (1 - u^2 - v^2)^{\frac{1}{\varkappa - 1}}$ denotes density and $\varkappa$ the index of the adiabatic. On the ellipse round which the flow passes the boundary condition $u = 0$ holds, and in infinity $u \to U_\infty \cos\eta$ and $v \to -U_\infty \sin\eta$ hold. Because of the symmetry of the flow only the domain $-\pi/2 \leq \eta < \pi/2$ must be investigated. Computation is followed step by step. In this way the equation $d\Gamma/d\xi$ is obtained for the circulation Γ. The numerical coefficient of the corresponding differential equations are given by a table. These 2N + 2 equations form a system for determination of the 2N + 2 required quantities, namely of the N values u_n and the N + 2 quantities v_n. (N here denotes the degree of

Card 2/3

approximation). The boundary value problem for the ordinary differential equations was solved by numerical integration by means of a digital computer. The values of v on the ellipse round which the flow passes were derived from the conditions in infinity. In conclusion, an example of a computation carried out in practice is described. The author thanks I. A. Abdullayev for his assistance in preparing computations. There are 1 figure, 2 tables, and 2 Soviet references.

ASSOCIATION: Vychislitel'nyy tsentr Akademii nauk SSSR (Computation Center of the Academy of Sciences, USSR)

PRESENTED: November 6, 1958, by A. A. Dorodnitsyn, Academician

SUBMITTED: November 1, 1958

S/170/60/003/07/06/011
B012/B054 82232

10.3000

AUTHORS: Chushkin, P. I., Shchennikov, V. V.

TITLE: Calculation of Some Axially Asymmetric Conical Flows

PERIODICAL: Inzhenerno-fizicheskiy zhurnal, 1960, Vol. 3, No. 7, pp. 88 - 94

TEXT: Conical supersonic gas flows without axial symmetry were investigated in the papers (Refs. 1-8). It is pointed out here that this mathematical problem is very complicated, and that it seems convenient to find the solution of the exact linear equations of this problem by means of numerical methods based on the use of electron computers. First, the authors investigate the equation of the problem set and the boundary conditions. The flow around an infinite cone is studied. The latter is placed in a uniform supersonic gas flow under an afflux angle α. It is assumed that the cone has a plane of symmetry and that the vector of the velocity w_∞ of the oncoming flow lies in that plane. In the flow around the cone, a conical shock wave is formed in a certain range of w_∞ (or the corresponding Mach numbers M_∞) and α. The

peak of this wave coincides with the peak of the cone flowed around; the form of the wave, however, is not known before. The authors write down the differential equations, i.e. the equations of motion (1.1), (1.2), and (1.3), as well as the equation of continuity (1.4). The fifth equation written down is formula (1.5) for the adiabatic course. The Bernoulli integral (1.6) is taken instead of (1.1). The system (1.2) - (1.6) must be integrated under certain boundary conditions in the range between the shock wave and the cone flowed around. The authors write down formula (1.7) for the boundary condition on the cone flowed around and the equation system (1.8) for the boundary conditions on the shock wave. Finally, they indicate formula (1.9) for the derivations of the gas-dynamic functions. The problem is solved by approximation with the aid of the numerical method of integral relations by A. A. Dorodnitsyn (Ref. 9). The differential equations (2.5) are obtained. They can be integrated by the numerical method with the aid of an electron computer. The corresponding boundary problem can be solved by selection. The system (2.5) also contains a constant value of the entropy ϑ_0 on the surface of the cone flowed around. The determination

of this quantity depends on the character of the line of constant entropy. It is pointed out that the method described can only be used in such cases where the velocity component $\sqrt{v_{\psi 0}^2 + v_{\theta 0}^2}$ on the surface of the body is smaller than the sonic velocity. Moreover, it is pointed out that it is possible to compare the approximate solution obtained with the available accurate solution if the differential equations (2.5) are applied to the case of an axially symmetric circular cone. In order to evaluate the accuracy of the approximation method described, it was first applied to the flow around a circular cone at $\alpha = 0$. The calculations were made by I. N. Naumova. Fig. 2 shows the results and compares them with the known accurate solution. Hence it appears that maximum accuracy is attained with high Mach numbers if the range between shock wave and cone flowed around becomes smaller. Figs. 3 and 4 show two further examples. There are 4 figures and 12 references: 7 Soviet and 5 British.

ASSOCIATION: Vychislitel'nyy tsentr AN SSSR, g. Moskva (Computing Center of the AS USSR, Moscow)

CHUSHKIN. P. I., and SHCHENNIKOV, V. V.

"On the Calculus of Some Non-Axisymmetric Conical Flows."

report presented at the First All-Union Congress on Theoretical and Applied Mechanics, Moscow, 27Jan - 3 Feb 1960.

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10 6120 also 1121, 1327

87795
S/040/60/024/005/018/028
C111/C222

AUTHOR: Chushkin, P.I. (Moscow)

TITLE: Truncated Bodies of Simple Form in a Supersonic Gas Flow

PERIODICAL: Prikladnaya matematika i mekhanika, 1960, Vol.24, No.5, pp.927-930

TEXT: The author describes a method of characteristics for the calculation of supersonic flows being especially suitable for the application for electronic computers. The basic functions are $x, y, \beta = \mathrm{ctg}\alpha = \sqrt{M^2-1}$, $\zeta = \mathrm{tg}\,\theta$ and $\ln(p/\varrho^{\varkappa})$, where θ is the angle of inclination of the velocity vector to the x-axis, ϱ is the dimensionless density related to ϱ_∞, p is the dimensionless pressure related to $\varrho_\infty a_*^2$, a_* is the critical sound velocity, $\varkappa$ is the adiabatic exponent. Instead of the flow function ψ the author introduces the modified flow function Ψ according to $d\Psi = (\varrho v^s)^{1/(\varkappa-1)}$. For the calculation of the unknowns in an intersection point of characteristic lines lying in the field of flow, the author uses the iteration method

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Truncated Bodies of Simple Form in a Supersonic Gas Flow

$$x_2 = \frac{x_1 - mnx_0 + m(y_0 - y_1)}{1 - mn}, \quad y_2 = y_0 + n(x_2 - x_0) \tag{4}$$

$$\Psi_2 = \Psi_0 + q(x_2 - x_0), \quad s_2 = s(\Psi_2)$$

$$\beta_2 = \frac{\zeta_1 + K\beta_1 - L(y_2 - y_1) + P(s_2 - s_1) - \zeta_0 + J\beta_0 - N(x_2 - x_0) + Q(s_2 - s_0)}{J + K} \tag{5}$$

$$\zeta_2 = \frac{J[\zeta_1 + K\beta_1 - L(y_2 - y_1) + P(s_2 - s_1)] + K[\zeta_0 - J\beta_0 + N(x_2 - x_0) - Q(s_2 - s_0)]}{J + K}$$

where $J = K = -\frac{2\beta^2(\zeta^2+1)}{(\varkappa+1)(\beta^2+1)(\varepsilon\beta^2+1)}$, $L = j\frac{\zeta(\zeta^2+1)}{y(\beta\zeta+1)}$, $N = j\frac{\zeta(\zeta^2+1)}{y(\beta+\zeta)}$,

$P = Q = \frac{\beta(\zeta^2+1)}{\varkappa(\varkappa-1)(\beta^2+1)}$, j=0 for plane and j=1 for axialsymmetrical flows;

$m \equiv \frac{\beta-\zeta}{\beta\zeta+1} = \frac{dx}{dy}$, $n \equiv \frac{\beta\zeta-1}{\beta+\zeta} = \frac{dy}{dx}$; $\varepsilon = \frac{\varkappa-1}{\varkappa+1}$., correspond to the first and second family of characteristic lines. If the unknown point lies on

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Truncated Bodies of Simple Form in a Supersonic Gas Flow

the body then the iteration method of Ehlers (Ref,4) is used. The results of the calculations are summarized in some figures.

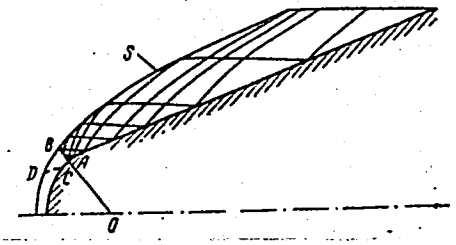

Fig. 2

Figure 2 shows the flow around of a truncated cone (half opening angle $\delta = 20^{\circ}$) for $M_{\infty} = 6$; S is the shock wave, CD is the sound line.

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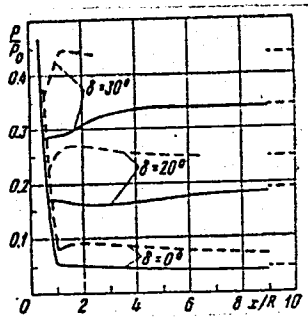

Fig. 4

Figure 4 shows the pressure distribution on the surface of truncated wedges (dashed line) and cones (unbroken line) for $M_\infty = 4$; p_0 is the pressure in the focus, R is the radius of truncation.

The author mentions A.A.Dorodnitzyn, O.M. Belotserkovskiy and Yu.D. Shmyglovskiy. He thanks Van Shu-lin, I Chen'-guey, Ku Iuan, and Len Zun-kay for the programming and performance of the calculations in

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Truncated Bodies of Simple Form in a Supersonic Gas Flow

the institute vychislitel'noy tekhniki Akademii nauk KNR (Institute of Computing Technics of the Academy of Sciences of the Chinese Peoples' Republic).

There are 6 figures and 5 references: 4 Soviet and 1 American.

SUBMITTED: June 15, 1960

X

Card 5/5

BELOTSERKOVSKIY, Oleg Mikhaylovich; CHUSHKIN, P.I., otv. red.; ORLOVA, I.A., red.; POPOVA, N.S., tekhn. red.

[Calculation of flows past axisymmetric bodies in the case of a frontal shock wave; calculation formulae and tables for flow fields] Raschet obtekaniia osesimmetrichnykh tel s otoshedshei udarnoi volnoi; raschetnye formuly i tablitsy polei techenii. Moskva, Vychislitel'nyi tsentr AN SSSR, 1961. 55 p. (MIRA 14:11)

(Aerodynamics—Tables, etc.)

CHUSHKIN, P.I.; SHULISHNINA, N.P.; SHMYGLEVSKIY, Yu.D., otv. red.; ORLOVA, I.A., red.; POPOVA, N.S., tekhn. red.

[Tables for supersonic flow around blunt-nosed cones] Tablitsy sverkhzvukovogo techeniia okolo zatuplennykh konusov. Moskva, Vychislitel'nyi tsentr AN SSSR, 1961. 91 p. (MIRA 15:1)

(Aerodynamics, Supersonic—Tables, etc.)

CHUSHKIN, P.I.

BR

PHASE I BOOK EXPLOITATION SOV/5962

Vsesoyuznoye soveshchaniye po vychislitel'noy matematike i primeneniyu sredstv vychislitel'noy tekhniki, Baku, 1958.

Trudy (Transactions of the All-Union Conference on Computer Mathematics and Applications of Computers) Baku, Izd-vo AN Azerbaydzhanskoy SSR, 1961. 254 p. 500 copies printed.

Sponsoring Agency: Akademiya nauk Azerbaydzhanskoy SSR. Vychislitel'nyy tsentr.

Eds.: A.A. Dorodnitsyn, S.A. Aleskerov, and K.F. Shirinov; Ed. of Publishing House: A. Til'man; Tech. Ed.: T. Ismailov.

PURPOSE: The book is intended for mathematicians and other specialists interested in computer theory and uses for computers.

COVERAGE: The book contains the texts of 24 papers presented at the All-Union Conference on Computer Mathematics and Applications of Computers held in Baku, 3-8 Feb 1958. The "Resolution"

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of the conference, consisting of proposals for accelerating the development of computer mathematics and computer engineering, is also included.

TABLE OF CONTENTS:

CHUSHKIN, P. I.

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AUTHORS: Belotserkovskiy O. M., Kibel' J. A., Moiseyev N. N., Khristianovich S. A., Chushkin P. I., and Shmyglevskiy Yu. D.

TITLE: Anatoliy Alekseyevich Dorodnitsyn (on the occasion of his 50th birthday

PERIODICAL: Uspekhi matematicheskikh nauk, v. 16, no. 2, 1961, 189-196

TEXT: A. A. Dorodnitsyn was born on December 2, 1910 in the district Tula. In 1931 he finished the study at the Mining Fuculty of the Petroleum Institute Groznyy. Since 1935 he worked in the Glavnaya geofizicheskaya observatoriya (Geophysical Main Observatory) in Leningrad under the leading of J. A. Kibel' (school of N. Ye. Kochin). In 1939 -- candidate of physical-mathematical sciences. Since 1941 he was in the Tsentral'nyy aerogidrodinamicheskiy institut imeni N. Ye. Zhukovskogo (Central Aerohydrodynamic Institute imeni N. Ye. Zhukovskiy). In 1942 -- Doctor dissertation "Boundary layer in a compressible gas". In 1953 -- member of the Academy of Sciences of the

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S/042/61/016/002/005/005
C 111/ C 222

Anatoliy Alekseyevich Dorodnitsyn ...

USSR. Since 1955 he is the director of the Vychislitel'nyy tsentr Akademii nauk SSSR (Computing Center of the Academy of Sciences USSR). Educational activity: 1939-1940 -- docent at the Chair of Higher Mathematics in the Leningrad Mining Institute; 1944-1946 - Professor at the Chair of Theoretical Aerodynamics of the Moskovskiy aviatsionnyy institut imeni S. Ordzhonikidze (Moscow Aviation Institute imeni S. Ordzhonikidze). Since 1947 - Professor and leader of the Chair of Gas Dynamics of the Moskovskiy fiziko-tekhnicheskiy institut (Moscow Physical-Technical Institute). Furthermore - President of the Komissiya po vychislitel'noy tekhnike AN SSSR (Committee of Computing Technics of the Academy of Sciences USSR); member of the Komitet po Leninskim premiyam (committee for Lenin Prizes); president of the ekspertnaya komissiya VAK po avtomatizatsii i priborostroyeniya (Committee of Specialists of the VAK for Automatization and Construction of Equipment) Chief editor of the "Zhurnal vychislitel'noy matematiki i matematicheskoy fiziki (Journal of computing mathematics and mathematical physics). A. A. Dorodnitsyn participated in the following congresses: Sweden in 1957; USA in 1958; France in 1959; Poland in 1959; Spain in 1958;

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Anatoliy Alekseyevich Dorodnitsyn ... C 111/ C 222

Switzerland in 1960. His papers contain essential contributions in the domains: dynamic meteorology, gas dynamics and applied mathematics.

The authors mention N. Ye. Zhukovskiy and S. A. Chaplygin. There is a list containing the publications of A. A. Dorodnitsyn (1936-1960) with 23 titles and a photo of him.

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35333
S/194/62/000/001/007/066
D201/D305

10.1200

AUTHORS: Belotserkovskiy, O. M. and Chushkin, P. I.

TITLE: Use of an electronic digital computer for certain problems of high speed aerodynamics

PERIODICAL: Referativnyy zhurnal, Avtomatika i radioelektronika, no. 1, 1962, abstract 1-1-96u (Tr. Vses. soveshchaniya po vychisl. matem. i primeneniyu sredstv vychisl. tekhn. Baku. AN Azerb SSR, 1961, 39-52)

TEXT: Numerical methods of solving certain problems of aerodynamics (flow) are considered. Depending on the speed of flow, the calculation of streamline at subsonic speeds reduces to analysis of two-dimensional problems of gas dynamics. The method of integral ratios (IR) of A. A. Dorodnitsyn was used in the calculations. The principle is as follows: Each of the equations of gas dynamics in orthogonal coordinates ξ, η may be represented in the general form

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$$\frac{\partial f}{\partial \xi} + \frac{\partial f}{\partial \eta} + F = 0 \qquad (1)$$

where f, φ, F - known functions of coordinates ξ; η - components of velocity U; V - along the coordinate lines η = const., and ξ = const, of density ρ and pressure p. In the IR method the problem is solved by approximations. In the N-th approximation Eq. (1) integrated, e.g. along the coordinate ξ from ξ = 0 to N lines, is represented by N definite integrals of the form

$$\frac{d}{d\eta}\int_0^{\xi_n} \varphi d\xi - \varphi_n \frac{d\xi_n}{d\eta} + f_n - f_o + \int_0^{\xi_n} F\, d\xi = 0$$

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All integrand functions ξ are approximated next. This makes it possible to arrive at a system of ordinary differential equations with respect to components of velocities U_n, V_n. This system is numerically integrated on a digital computer using standard programming. There is with it a boundary problem; this problem is solved by trial, using one computer. Power and trigonometrical series were used as interpolation expressions for integrands. The above method was used for evaluating the critical numbers (Mach numbers of the flow at which the speed of sound is attained locally at the body in the stream), for symmetrically streamlined ellipses and ellipsoids. The results obtained show good convergence and adequate accuracy of the method in the given problem. The above method was also used to evaluate the subsonic streamlined symmetrical Zhukovskiy profile at zero attack angle. The IR method is applicable to both plane and axially symmetric flows. The accuracy of evaluation of separate gas-dynamical magnitudes differs and depends on several factors (Mach number, relative body thickness δ, etc.). The IR method was used for solving mixed gas dynamics problems. In special types of flow a part of the boundary of the calculated region is usually

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unknown. The following were investigated: symmetrically streamlined bodies, moving at the speed of sound, streamlining a symmetrical profile by a supersonic gas stream in the presence of a receding shock-wave. Results of the evaluation of supersonic flows are given. The so-called finer method of characteristics (MC) was used, whose error is of the order of a cubic grid step. The method is identical with the well-known method of tangents as used in numerical integration of ordinary differential equations. In this case the values of all functions at the nodal point of the characteristic grid being calculated and determined initially by the method of tangents, are made more accurate by further calculations using the trapezoid formula. The MC was used for the problems of supersonic streamlining of axially symmetrical bodies, as this problem was of great practical interest. The axially symmetrical flow of freely expanding gas, having a flat transition plane, was analyzed, together with the supersonic flow in a ring jet with an axially symmetrical body inside it which produced at the jet output an even supersonic stream. The above methods in conjunction with electronic

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digital computers can be applied to analogous problems of physics and mechanics. 10 figures. 11 references. [Abstracter's note: Complete translation.]

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S/030/62/000/002/005/008
B105/B110

AUTHORS: Dorodnitsyn, A. A., Academician, Nikol'skiy, A. A., Doctor of Physics and Mathematics, Chushkin, P. I., Candidate of Physics and Mathematics

TITLE: Aerodynamics of high velocities and high altitudes

PERIODICAL: Akademiya nauk SSSR. Vestnik, no. 2, 1962, 80 - 83

TEXT: From August 28 to September 2, 1961 a conference on the mechanics of fluids and gases was convened by the Polish Academy of Sciences at Jablonna, a suburb of Warsaw. This conference dealt with problems of the aerodynamics of high-velocities and high altitudes. The conference was attended by delegates from Austria, Great Britain, the German Democratic Republic, Roumania, the USSR, and France. At the conference problems of the boundary layer, dilute gases and of hypersonic flows were discussed. A. A. Dorodnitsyn suggested a numerical method of calculating the equations of the laminar boundary layer in the case of incompressibility, and showed that this method can be extended to the compressible boundary layer. The numerical method of calculating equations of the boundary layer

of a bluff body which had been developed at the Vychislitel'nyy tsentr Akademii nauk SSSR (Computer Center of the Academy of Sciences USSR) were described. Yu. N. Pavlovskiy (USSR) reported on results of methods of group analysis for equations of the boundary layer in the case of incompressibility. V. Prosnak (Poland) spoke about the calculation of the boundary layer between two incompressible flows moving in opposite directions. Ya. Lubonski (Poland) described a special case of the Couette flow. P. I. Chushkin and O. M. Belotserkovskiy (USSR) gave the numerical solution of the problem of bluff bodies being circumflown by ultrasonic flight velocities. A. A. Nikol'skiy (USSR) dealt with the nonsteady axisymmetrical movements of the incompressible fluid of infinite conductivity. S. Apanasewicz (Poland) studied magnetohydrodynamic problems. K. P. Stanyukovich (USSR) spoke about the propagation of cylindrical waves in gas. V. Fiszdon and Z. Dzigadlo (Poland) dealt with the solution of linearized problems of harmonic oscillations of axisymmetrical bodies in the ultrasonic gas flow. Yu. Bonder (Poland) suggested a new invariant form for equations of gas dynamics for the compressible nonsteady case. I. M. Yur'yev (USSR) and K. Iacob (Roumania) dealt with the development of the theory of S. A. Chaplygin for plane gas flows. New problems of gas dynamics were

discussed which arise in flights at high velocities and high altitudes.

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S/208/62/002/002/005/014
D234/D302

AUTHOR: Chushkin P.I. (Moscow)

TITLE: Investigation of supersonic flow past blunt-nosed bodies of revolution

PERIODICAL: Zhurnal vychislitel'noy matematiki i matematicheskoy fiziki, v. 2, no. 2, 1962, 255 - 277

TEXT: A description of the results of numerical calculations carried out by the author and N.P. Shulishnina for axially symmetric supersonic flow of an ideal gas past blunt-nosed cones; tables of the results were published previously (Ref. 2: P.I. Chushkin, N.P. Shulishnina: Tablitsy sverkhzvukovogo techniya okolo zatuplennykh konusov, (Tables of Supersonic Flow Past Blunted Cones) M., VTs AN SSSR, 1961). A comprehensive review of existing literature is given. The numerical results are studied with respect to the form of shock wave and the distribution of gas-dynamical functions at the surface of the body and across the domain between the latter and the shock wave. The numerical solution is compared with approximate analytical solutions obtained by other authors and with

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Investigation of supersonic flow ...

experimental results. It is concluded that the theory based on non-stationary analogy makes it possible to determine with acceptable accuracy the form of shock wave and the pressure distribution on blunt-nosed cylinders and thin cones for a large x and very high supersonic speeds. It is pointed out that the simplified theory of G.G. Chernyy (Ref. 24: Izv. AN SSSR, Otd. tekh.n.Mekhan. i mashinostr. 1958,no. 4, 54 - 66) gives generally correct qualitative cones, also quantitatively acceptable results. The author acknowledges the advice of O.S. Ryzhov. There are 15 figures and 42 references: 20 Soviet-bloc and 22 non-Soviet-bloc. The 4 most recent references to the English-language publications read as follows: R. Vaglio-Laurin, M. Trella: Aerospace Sci. 1961, 6, 10 - 23; R. Capiaux, L. Karchmar, Amer. Rocket Soc. (Preprints), 1961, no. 210; H.K. Cheng, A.L. Chang, A.R.S. Journal, 1961, 31, no. 7, 1024 - 1026; H.W. Ridyard, Planet and Space Sci. 1961, 6, 10 - 23

SUBMITTED: December 10, 1961

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16.6500

S/208/62/002/005/001/009
B112/B102

AUTHORS: Belotserkovskiy, O. M., Chushkin, P. I. (Moscow)

TITLE: Numerical method of integral relations

PERIODICAL: Zhurnal vychislitel'noy matematiki i matematicheskoy fiziki, v. 2, no. 5, 1962, 731-759

TEXT: Investigations carried out at the Vychislitel'nyy tsentr Akademii nauk SSSR (Computer Center of the Academy of Sciences USSR) are reported. In N-th approximation, a system

$$\partial P_i(x,y,u_1,\ldots,u_k)/\partial x + \partial Q_i(x,y,u_1,\ldots,u_k)/\partial y = F_i(x,y,u_1,\ldots,u_k) \quad (1)$$

is reduced to a system of kN ordinary differential equations in the following way: For each index i, a system of N linearly independent functions $f_n(y)$ is chosen. The integrals

$$\int_0^{\Delta(x)} f_n(y)P\,dy$$

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Numerical method of integral relations

occurring in the integral relations of the form

$$d\left(\int_0^{\Delta(x)} f(y)Pdy\right)/dx - \Delta'(x)f(\Delta)P_\Delta + f(\Delta)Q_\Delta - f(0)Q_0 - \int_0^{\Delta(x)} f'(y)Qdy = \int_0^{\Delta(x)} f(y)Fdy \quad (3)$$

are represented by $\Delta(x)\sum_{n=0}^{N} C_n P_n(x)$, where $P_n(x) = P(x,y_n,u_{1n},\ldots,u_{kn})$, $u_{\nu n} = u_\nu(x,y_n)$, $y_n(x) = n\Delta(x)/N$. Hence the integral relations (3) form a system of kN ordinary differential equations in the variable x with the $k(N+1)$ unknown functions $u_{\nu n}(x)$. The system completed by k boundary conditions may be solved by an arbitrary numerical method. Many gasdynamical problems have been solved by this method. Potential flows, shock waves, and flows of a viscous gas are considered as examples. There are 13 figures.

SUBMITTED: June 1, 1962

Card 2/2

CHUSHKIN, P. I. ;

" Numerical Analysis of Some Problems of Gas Flow". Dorodynitsyn's method of integral relations used to solve direct and inverse problems of transomic flow in Laval nozzle, onedimensional unsteady blast-wave motion in perfect gas with counter-pressure, and supersonic flow past blunt body at small magnetic Reynolds number.

Report submitted for the 6th Symposium on Advanced Problems in Fluid Mechanics, Zakopane, Poland, 2-6 Sept 1963.

ALL PAPERS WILL BE PUBLISHED IN A 1964 ISSUE OF THE POLISH JOURNAL OF APPLIED MECHANICS, ARCHIWUM MECHANIKA STOSOWANEJ.

L 18716-63 EPR/EPA(b)/BDS AFFTC/ASD Ps-4/Pd-4 WW
ACCESSION NR: AP3006122 S/0207/63/000/004/0048/0057

64
62

AUTHOR: Korobeynikov, V. P. (Moscow); Chushkin, P. I. (Moscow)

TITLE: Calculation of the initial stage of a point explosion in various gases

SOURCE: Zhurnal prikladnoy mekhaniki i tekhnicheskoy fiziki, no. 4, 1963, 48-57

TOPIC TAGS: point explosion, back pressure, blast wave, linearized problem, plane wave, cylindrical wave, spherical wave, adiabatic exponent, hypersonic flow, self similarity model, blunt-nosed body, slender body

ABSTRACT: A numerical solution of a linearized point-explosion problem with back pressure taken into account is considered in the cases of plane, cylindrical, and spherical waves in gases within a wide range of adiabatic exponent γ. A method is outlined for the solution of linearized blast-wave problems which is very convenient for computer calculations. A program was designed for the BESM-2 computer which makes it possible to obtain solutions for various values of $\gamma (1 < \gamma < 7)$ in the cases of plane, cylindrical, and spherical waves and to obtain functions of the total energy, temperature, and entropy in linear approximation. The results, which are presented in tabular form, contain both autosimilar

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and linearized functions. The linearized solution of the blast-wave theory was applied to the problem of hypersonic flow over blunt-nosed slender bodies (M = 10 — 21). Comparison of the results obtained by linearized solution with those obtained by numerical solution for the flow over bodies indicated the possibility of applying the solution of the problem of blast-wave theory to solve the problem of hypersonic flow over blunt-nosed slender bodies and vice versa. "The authors thank K. V. Sharovatova and R. T. Dzhayembayev for making the calculations." Orig. art. has: 9 figures, 21 formulas and 1 table.

ASSOCIATION: none

SUBMITTED: 25Apr63 DATE ACQ: 11Sep63 ENCL: 00

SUB CODE: AI NO REF SOV: 010 OTHER: 006

Card 2/2

KOROBEYNIKOV, V.P.; CHUSHKIN, P.I.; SHAROVATOVA, K.V.; ORLOVA, I.A., red.; KORKINA, A.I., tekhn.red.

[Tables of gas dynamic functions of the initial stage of a point explosion] Tablitsy gazodinamicheskikh funktsii nachal'noi stadii tochechnogo vzryva. Moskva, 1963. 57 p. (Akademiia nauk SSSR. Vychislitel'nyi tsentr. Soobshcheniia po vychislitel'noi matematike, no.2). (MIRA 16:12)

ALIKHASHKIN, Ya.I. (Moskva); FAVORSKIY, A.P. (Moskva); CHUSHKIN, P.I. (Moskva)

Calculation of the [illegible] in a flat Laval nozzle. Zhur. vych. mat i mat. fiz. 3 no.6:1130-1134 N-D '63. (MIRA 17:1)

ACCESSION NR: AP5001254

AUTHOR: Chushkin, P. I. (Moscow)

TITLE: Numerical solutions of some problems in gas flow

SOURCE: Archiwum mechaniki stosowanej, v. 16, no. [illegible], 1964, [illegible]

TOPIC TAGS: subsonic flow, transonic flow, supersonic flow, ordinary differential [illegible] shock wave, shock propagation, [illegible] flow

ABSTRACT: Numerical solutions of four different types of [illegible] computing center of the Academy of Sciences [illegible] transonic part of a [illegible] flow [illegible] supersonic [illegible] of a [illegible] first three problems the [illegible] hodograph method was used. The method consists in dividing the [illegible] flow into substrips by the set of lines $y = y_n(x) = \frac{n}{N} y_N(x)$, $n = 1, 2, \ldots, N$, integrating the flow equations across each region, obtaining a set of kN [illegible] relations, and representing them as kN ordinary differential equations in x on all the strip boundaries. In the first problem 2-dimensional Chaplygin's equations are

used to describe the potential flow in the subsonic-transonic region of a Laval nozzle with a given wall contour $\vartheta_N(s)$. The N-strips are divided along flow stream lines [illegible] = ψ_n = n/N, and the 2N integral relations are represented by the two interpolation polynomials $F = \sum_{n=0}^{N} \sum_{k=0}^{N} a_{nk} F_k(\varphi) \psi^{2n}$ [illegible]. The integration is started from one of the singular points $\vartheta_N = 0$ at [illegible] = 0, where $dy_n = \Delta_n$. The second problem was solved for plane, cylindrical, and spherical explosions. The gas is assumed non-heatconducting, adiabatic, and inviscid. The strips were determined by the lines $\xi = \xi_n(y) = \frac{N-n}{N} \xi_0(y) + \frac{n}{N}$, $n = 1, 2, \ldots N-1$, where ξ is the nondimensional spatial coordinate. A set of 4N integral relations was obtained for the various unknowns (density, pressure, energy, and wave speed). [illegible] results are given for the [illegible] by the method being [illegible] considers the flow of an ideal supersonic gas [illegible] at [illegible] Reynolds numbers. The flow field between the shock wave and the body is divided into strips with boundaries $r = r_n(\theta) = 1 - \frac{n}{N} r(\theta)$, $n = 0, 1, \ldots N$

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A set of 3N + 1 differential equations are obtained in [illegible]. Numerical solutions are given for $M_\infty = \infty$. Finally, a new method from V. V. Sy*chev [illegible]

[illegible]skikh rabot po aerodinamike, Oborongiz, Moscow, [illegible] is described [illegible]ving the 3-dimensional hyberbolic Cauchy problem between the [illegible] and [illegible] surface. It consists essentially of reducing [illegible] to a system of 2-dimensional equations in x and [illegible]

[illegible]ting $\vec{f}$ and $\vec{F}$ by the magnitudes of their meridional planes or, $\vec{f} = \sum_{n=0}^{N} f_n(x,\xi)\cos n\Psi$, $\vec{F} = \sum_{n=1}^{N} B_n(x,\xi)\sin n\Psi$. The problem is then solved by the usual characteristics method. A numerical result is given for a blunt cone and a cylind- [illegible] $M_\infty = \infty$. Orig. art. has: 21 formulas and 15 figures.

ASSOCIATION: Vy*chislitel'ny*y tsentr, AN SSSR (Computing Center, AN SSSR)

SUBMITTED: 00 ENCL: 00

SUB CODE: ME NR REF SOV: 016 OTHER: 002

Card 3/3

ACCESSION NR: AP4010746 S/0020/64/154/001/0026/0029

AUTHOR: Katskova, O. N.; Chushkin, P. I.

TITLE: One scheme for a numerical method of characteristics

SOURCE: AN SSSR. Doklady*, v. 154, no. 1, 1964, 26-29

TOPIC TAGS: numerical computation method, computer, characteristics method, supersonic gas flow, aerodynamics

ABSTRACT: The authors introduce a numerical method of computation of stationary supersonic gas flow in the vicinity of a three-dimensional body in the region between the shock wave and the body surface. The method is devised to replace the three-dimensional method of characteristics or the finite-differences method, which require very complex programming for electronic computers. The equations of the body and the (unknown) equation of the wave are expressed in cylindrical coordinates. A system of equidistant meridional planes (ϕ = const.) is considered, and in the three-dimensional equations of the problem the func-

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tions are approximated by trigonometric polynomials in ϕ with interpolation nodes in these planes. This reduces the equations to a system of two-dimensional equations in x and ϕ. A two-dimensional method of characteristics is then used. The method is tested by the computation of a supersonic, nonisentropic axial-symmetric flow of a perfect gas in the vicinity of a body of revolution. The accuracy of the method is satisfactory. It can be easily generalized for the case of a real gas in thermal equilibrium. Orig. art. has: 1 figure and 8 equations.

ASSOCIATION: Vy*chislitel'ny*y tsentr Akademii nauk SSSR (Computer Center, Academy of Sciences, SSSR)

SUBMITTED: 23Jul63 DATE ACQ: 10Feb64 ENCL: 00

SUB CODE: ME NO REF SOV: 004 OTHER: 001

Card 2/2

ACCESSION NR: AP4013322 S/0020/64/154/003/0549/0552

AUTHORS: Korobeynikov, V. P.; Chushkin, P. I.

TITLE: A method for calculating point explosion in gases

SOURCE: AN SSSR. Doklady*, v. 154, no. 3, 1964, 549-552

TOPIC TAGS: hydromechanics, hydrodynamics, point explosion, gas point explosion, explosion wave, gas explosion

ABSTRACT: The propagation of explosion waves in a quiescent gas with the presence of back pressure in plane ($\nu = 1$), cylindrical ($\nu = 2$) and spherical ($\nu = 3$) cases was examined. The problem presented has a self-similar analytic solution in the case of a powerful explosion when back pressure is not important. The linearization method is used for computing the initial stage of explosion with back pressure. A problem without self-similarity and with consideration of back pressure can be solved in an approximate manner by introducing interpolation equations for the unknown functions, the unknown parameters of which are defined by special integral relations. A precise solu-

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tion can be obtained by numerical methods. Authors applied the method of integral relations as presented by A. A. Dorodnitsyn (Tr. III vsesoyuzn. matem. s"yezda, 1956, 4,447 (1958)), and O. M. Belotserkovskiy and P. I. Chushkin (Zhurn. vychislit. matem. i matem. fiz., 2, no. 5731 (1962)) for a numerical solution of an explosion with back pressure at $\nu = 1,2$ and 3 and with various values for γ (adiabatic index). The gas was assumed to be ideal and having a constant adiabatic index. "In conclusion, authors wish to thank V.P. Karlikov for valuable discussions and participation in the development of the initial variations of the calculation scheme as well as Ye. Bishimov for compiling the program and carrying out the computations." Orig. art. has: 7 equations.

ASSOCIATION: Matematicheskiy institut im. V. A. Steklova Akademii nauk SSSR (Mathematics institute of the Academy of sciences SSSR)

SUBMITTED: 27Jun63 DATE ACQ: 26Feb64 ENCL: 00

SUB CODE: PH, MM NR REF SOV: 009 OTHER: 001

Card 2/2

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ACCESSION NR: AP5024904 UR/0382/65/000/003/0067/0075
533.95:538.4+533.011.5

38
13

AUTHOR: Chushkin, P. I.

TITLE: Magnetized bodies in hypersonic gas flows

SOURCE: Magnitnaya gidrodinamika, no. 3, 1965, 67-75

TOPIC TAGS: hypersonic flow, magnetohydrodynamic, conducting gas, shock wave structure, uniform flow, axisymmetric flow, flow analysis, pressure distribution

ABSTRACT: A numerical method is presented for calculating plane and axisymmetric hypersonic flows of an electrically conducting gas at small magnetic Reynolds numbers about the nose region of blunt bodies. It is assumed that a given magnetic field is generated by a dipole located inside the body. The Dorodnitsyn method of integral relations is used to find the effect of the magnetic field on the flow. This method consists in dividing the minimum region of influence into N strips and integrating the partial differential equations taken in divergence form, with respect to one variable across each strip. The integrands in the obtained integral relations are represented approximately by interpolated polynomials with points of interpolation on the strip boundaries. Thus, an approximating system of ordinary differential

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equations is obtained whose solution yields the values of the unknown function for all strip boundaries. The flow field configuration is then obtained from the numerical solution of a related boundary value problem. Two different schemes of the method, differing by the direction of strips, are considered. The pressure distribution and the shock wave form are determined more accurately by the first scheme when the bodies are of complex form and the stand-off distance is not too large. The second scheme, which is simpler, is more advisable for smooth bodies and when stand-off distances are great. The results of numerical calculations by the first scheme are presented for flows over a circle and a sphere in the presence of a magnetic field at various free stream Mach numbers. Shock waves corresponding to various values of magnetic parameter of the field, the variation of flow parameters at the stagnation point with the magnetic field, and the pressure and entropy distributions on a sphere in various magnetic fields are given in graphs. The effect of M_∞ on pressure and entropy distributions on a body is illustrated for M_∞ = 6, 10, and ∞. The results also show that the increment of the total drag coefficient is 3 to 4 times higher than the increment of aerodynamic drag. Orig. art. has: 6 figures and 14 formulas. [AB]

ASSOCIATION: none

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ACCESSION NR: AP5024904

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SUBMITTED: 27Nov64 ENCL: 00 SUB CODE: ME, AS

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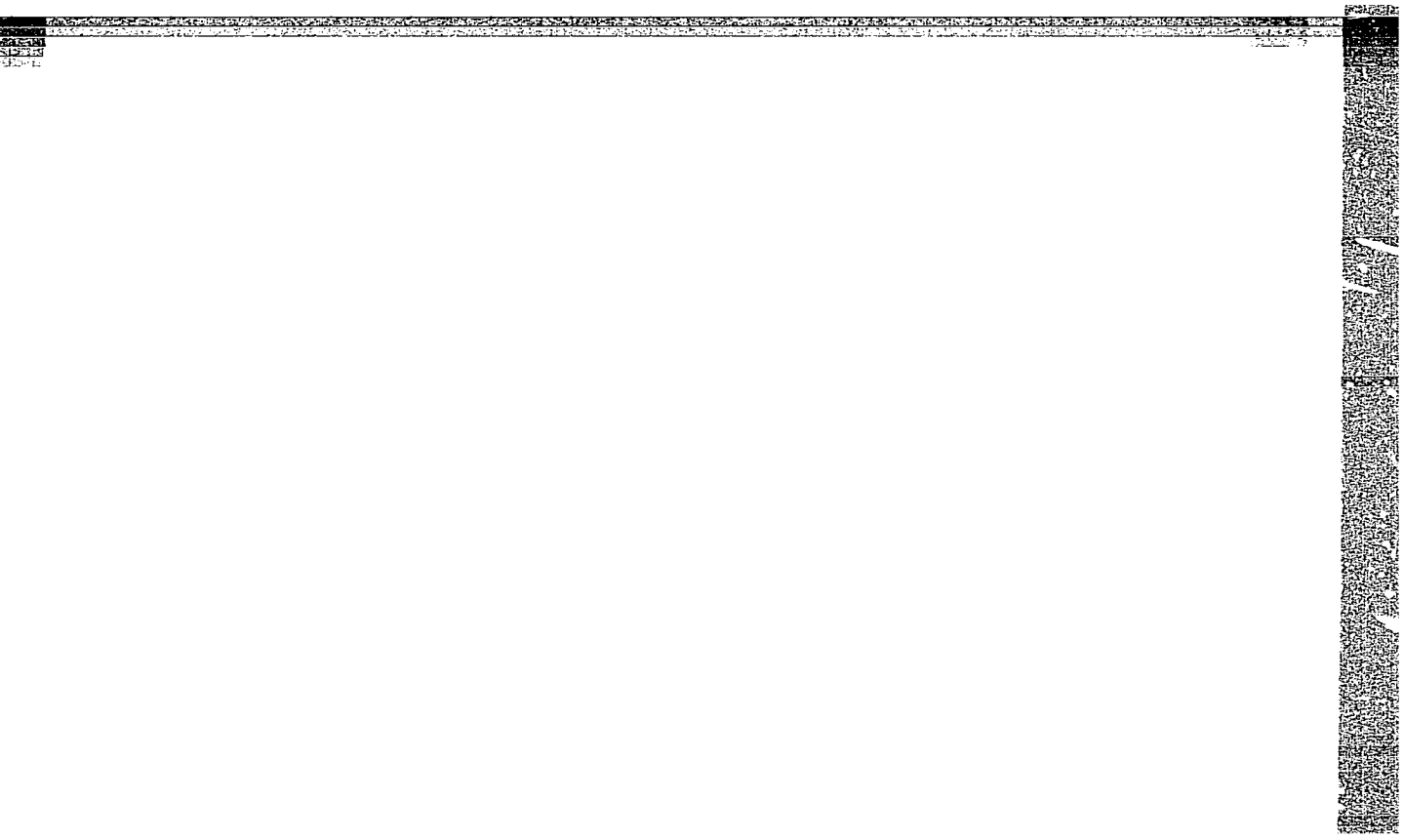
Card 3/3

Zhurnal vychislitel'noy matematiki i matematicheskoy fiziki, v. 5, no. 1, 1965, 57-66



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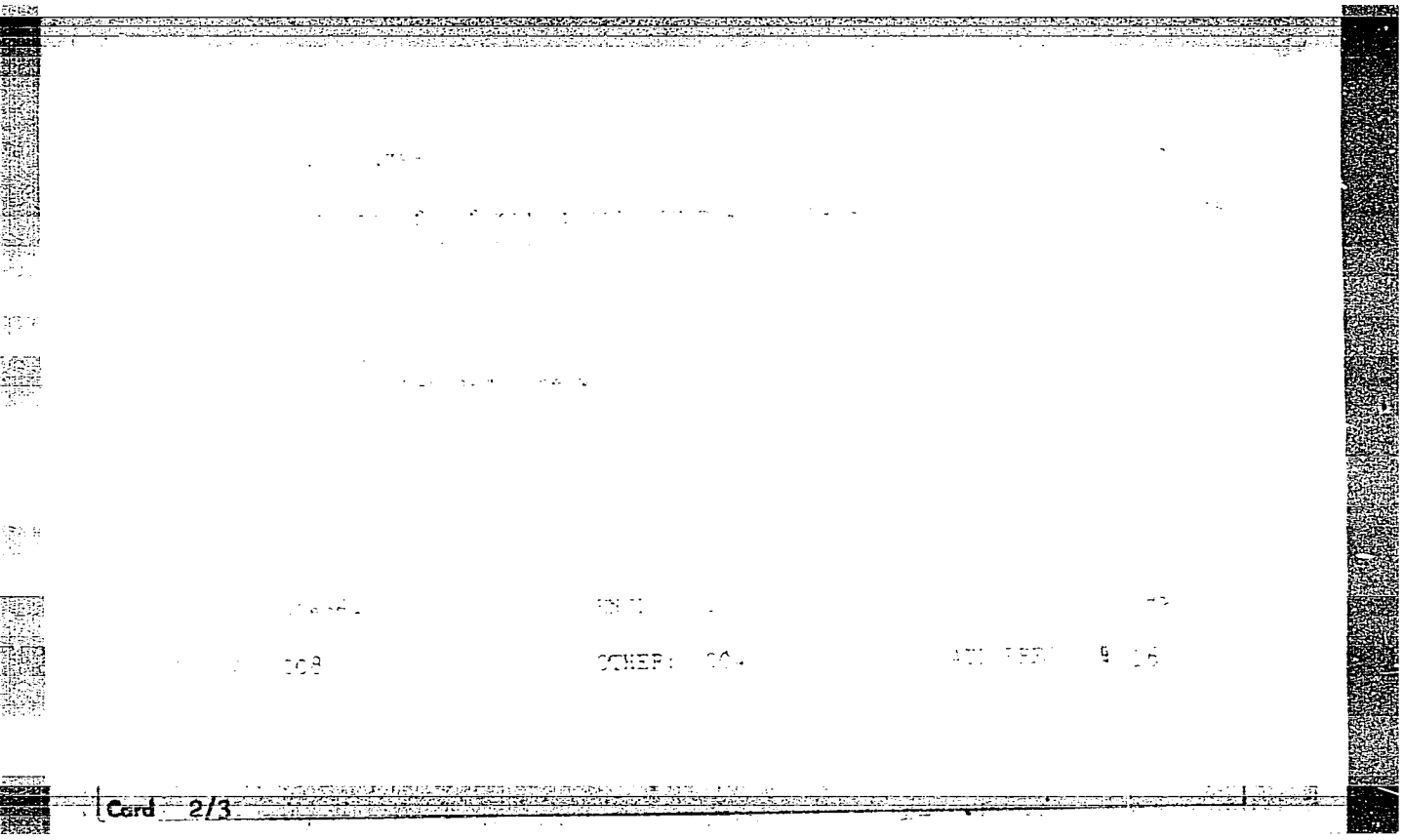
thermodynamic in equilibrium past a body with a plane of symmetry is considered.
assumed to be smooth so that no secondary shock waves are generated



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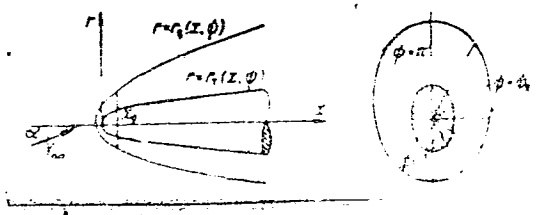

Fig. 1. Flow configuration

DIKUN, P.P.; CHUSHKIN, S.G.

Spectrum fluorescence analysis of tobacco smoke products. Vop.onk. 5 no.7:34-38 '59. (MIRA 12:12)

1. Iz laboratorii eksperimental'noy onkologii (zav. - chlen-korrespondent AMN SSSR prof. L.M. Shabad) Instituta onkologii AMN SSSR (dir. - deystvitel'nyy chlen AMN SSSR prof. A.I. Serebrov). Adres avtorov: Leningrad, P-129, 2-ya Berezovaya alleya, d.3, Institut onkologii AMN SSSR.

(TOBACCO - chemistry)

DIKUN, P. P.; KRASNITSKAYA, N. D.; CHUSHKIN, S. G.

Some data on the content of 3,4-benzopyrene in tobacco smoke. Vop. onk. 8 no.2:31-35 '62. (MIRA 15:2)

1. Iz laboratorii eksperimental'noy onkologii (zav. - zasl. deyat. nauki, prof. N. V. Lazarev) Instituta onkologii AMN SSSR (dir. - deystv. chl. AMN SSSR, prof. A. I. Serebrov). Adres avtorov: Leningrad, P-129, Institut onkologii AMN SSSR.

(CIGARETTE SMOKE) (BENZOPYRENE)